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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/536,665

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Rudolf Linde

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EXAMINER

WONG, EDNA

ART UNIT

PAPER NUMBER

1795

MAIL DATE

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02/28/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/536,665	Applicant(s) LINDE ET AL.	
	Examiner EDNA WONG	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-16 is/are pending in the application.
- 4a) Of the above claim(s) 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

This is in response to the Amendment dated January 16, 2008. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

Response to Arguments

Election/Restrictions

This application contains claim **16** drawn to an invention nonelected with traverse in the reply filed on September 20, 2007.

Claim Rejections - 35 USC § 103

I. Claims **10-15** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **EP 1,205,582** ('582) and **Horsthemke** (US Patent No. 6,837,981 B2) in combination with **Gardam** ("The Production of Machinable Cr Deposits", *J. of the Electrodepositors' Technical Soc.* (1945), Vol. 20, pp. 69-74).

The rejection of claims 10-15 under 35 U.S.C. 103(a) as being unpatentable over EP 1,205,582 ('582) and Horsthemke in combination with Gardam has been withdrawn in view of Applicants' amendment.

II. Claims **10-15** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Wilmeth et al.** (US Patent No. 5,196,108) in combination with **Gardam** ("The Production of Machinable Cr Deposits", *J. of the Electrodepositors' Technical Soc.*

(1945), Vol. 20, pp. 69-74).

The rejection of claims 10-15 under 35 U.S.C. 103(a) as being unpatentable over Wilmeth et al. in combination with Gardam has been withdrawn in view of Applicants' amendment.

III. Claims **10-12 and 14-15** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **DE 44 32 512** ('512) in combination with **Gardam** ("The Production of Machinable Cr Deposits", *J. of the Electrodepositors' Technical Soc.* (1945), Vol. 20, pp. 69-74).

The rejection of claims 10-12 and 14-15 under 35 U.S.C. 103(a) as being unpatentable over DE 44 32 512 ('512) in combination with Gardam has been withdrawn in view of Applicants' amendment.

Response to Amendment

Claim Rejections - 35 USC § 112

Claims **10-15** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10

line 15, the words "labyrinth-like" are indefinite.

Claim Rejections - 35 USC § 103

Claims **10-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Gardam** ("The Production of Machinable Cr Deposits", *J. of the Electrodepositors' Technical Soc.* (1945), Vol. 20, pp. 69-74) in combination with **DE 44 32 512** ('512), **EP 1,205,582** ('582), **Horsthemke** (US Patent No. 6,837,981 B2) and **Wilmeth et al.** (US Patent No. 5,196,108).

Horsthemke is the English equivalent of EP '582.

Gardam teaches a method of producing a structured hard chrome layer, comprising:

electrodepositing chromium (= applying a Cr deposit) from an electrolyte onto a workpiece (= an article), said electrolyte comprising:

(a) a Cr (VI) compound in an amount corresponding to 50 g/l to 600 g/l of chromic acid anhydride (= 250 g/l CrO₃); and

(b) 0.5 g/l to 10 g/l of sulphuric acid (= 2.5 g/l H₂SO₄);

wherein the cathodic current yield in the production of the structured hard chrome layer is 12% or less (= a current efficiency of 10% at 20 A/dm² and 12% at 40 A/dm²), such that said hard chrome layer comprises at least one of a cup-shaped structure, a labyrinth-like structure, or a column-shaped structure (= accentuated nodules) [abstract].

The Cr(VI) compound is CrO₃ (abstract).

The electrolyte comprises substantially no fluorides (abstract).

The method further comprises applying a current density of from 20 A/dm² to 200 A/dm² to the workpiece (= 20 A/dm² and 40 A/dm²) [abstract].

The method of Gardam differs from the instant invention because Gardam does not disclose the following:

- a. Wherein the electrolyte comprises 1 g/l to 20 g/l of aliphatic sulphonic acid, that comprises 1 to 6 carbon atoms, as recited in claim 10.
- b. Wherein the aliphatic sulphonic acid is methane sulphonic acid, as recited in claim 12.

Like Gardam, DE '512 teaches electrodepositing chromium. DE '512 teaches that that surface roughness of the structured chromium layer can be controlled by adjusting the separation duration and/or the current density and/or the electrolyte composition. One receives a particular high surface roughness of a much minted surface structure if the separating duration selected is particularly long. Same can be reached also with a relatively high separating current density. An influence of surface roughness by means of the electrolyte composition takes place, as quantities of the bath components and those additives are varied (pages 1-2, bridging paragraph).

A sample electrolyte comprised of 350 g/l CrO₃, 3.85 g/l H₂SO₄, 2.5 g/l methane sulfonic acid and 0.004 mol/l of the additive H₆TeO₆ (page 2 , Example 1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrolyte described by Gardam with wherein

the electrolyte comprises 1 g/l to 20 g/l of aliphatic sulphonic acid, that comprises 1 to 6 carbon atoms; and wherein the aliphatic sulphonic acid is methane sulphonic acid because a mix-acidic electrolyte would have been functionally equivalent in electrodepositing the chromium as taught by Gardam (page 1, last full paragraph), and adjusting such an electrolyte composition would have controlled the surface roughness of the structured chromium layer as taught by Gardam (pages 1-2, bridging paragraph).

c. Wherein the electrolyte comprises 10 g/l to 200 g/l of at least one compound forming a dense cathode film, said compound being selected from the group consisting of ammonium molybdate, alkali molybdate, alkaline earth molybdate, ammonium vanadate, alkali vanadate, alkaline earth vanadate, ammonium zirconate, alkali zirconate, and alkaline earth zirconate, as recited in claim 1.

d. Wherein the compound forming a dense cathode film is $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$, as recited in claim 13.

Like Gardam, Horsthemke and Wilmeth teach electrodepositing chromium.

Horsthemke teaches a $\text{CrO}_3\text{-H}_2\text{SO}_4$ electrolyte (col. 4, lines 43-57). Molybdenum in the form of molybdic acid (ammonium molybdate) or an alkali molybdate is added to the electrolyte as the isopolyanion-forming metal. The addition of 50-90 g/l molybdic acid proved to be especially advantageous (col. 4, lines 62-67). Chromium-molybdenum layers that are deposited from a sulfuric acid electrolyte, while having low crack density, have broad cracks that can reach from the surface to the base metal.

which degrades the corrosion resistance. The method overcomes this disadvantage through the addition of a short-chain aliphatic sulfonic acid, its salts and/or its derivatives, since in this way the crack density clearly increases. The cracks in the layers deposited with the method are therefore very fine and no longer extend to the base material. This has an extraordinarily advantageous effect on the corrosion resistance and produces a clear advantage for the layers deposited (col. 4, lines 8-34).

According to another embodiment, vanadium is added to the electrolyte as polyanion-forming metal. Preferably ammonium metavanadate, vanadic acid or vanadium pentoxide is used to generate a vanadium-containing electrolyte (col. 5, lines 1-6).

Wilmeth teaches a $\text{CrO}_3\text{-H}_2\text{SO}_4$ electrolyte (col. 4, lines 25-45; and col. 5, lines 1-8). Wilmeth teaches that the addition of the molybdenum anion (such as from about 10 to 100 g/l of ammonium molybdate) materially changes the fundamental character of the base electrolyte bath, providing a workpiece with improved wear resistance obtainable at high current efficiency and at a useful current density (col. 4, lines 46-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrolyte described by Gardam with wherein the electrolyte comprises 10 g/l to 200 g/l of at least one compound forming a dense cathode film, said compound being selected from the group consisting of ammonium molybdate, alkali molybdate, alkaline earth molybdate, ammonium vanadate, alkali vanadate, alkaline earth vanadate, ammonium zirconate, alkali zirconate, and alkaline

earth zirconate; and wherein the compound forming a dense cathode film is $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$ because the addition of ammonium molybdate to a $\text{CrO}_3\text{-H}_2\text{SO}_4$ electrolyte would have electrodeposited chromium layers with corrosion and wear resistance as taught by Horsthemke (col. 4, lines 8-57) and Wilmeth (col. 4, lines 25-55; and col. 5, lines 1-8).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Edna Wong/
Primary Examiner
Art Unit 1795

EW
February 15, 2008